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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,257	01/04/2002	Byung-Hee Kim	262/014	2929

7590 10/04/2002  
LEE & STERBA, P. C.  
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Arlington, VA 22209

EXAMINER

GUERRERO, MARIA F

ART UNIT PAPER NUMBER

2822

DATE MAILED: 10/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

10/035,257

Applicant(s)

KIM ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. This Office Action is the First Action on the merits.

Claims 1-3 are pending.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Drawings***

3. Figures 1A-1B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

The abstract of the disclosure is objected to because the abstract should not compare the invention with the prior art. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al. (U.S. 6,376,355) in view of Hsu et al. (U.S. 6,143,645).

Yoon et al. teaches a method of fabricating a semiconductor device having a recess in an insulating layer on a silicon substrate (Abstract). Yoon et al. teaches depositing a barrier metal on a whole surface of the insulating layer including the substrate surface in the recess region, selectively depositing an anti-nucleation layer on the barrier metal except in the recess region, and depositing a metal layer (tantalum or titanium) on the barrier metal except in the recess region (Fig. 2, 7-9, col. 1, lines 55-67, col. 2, lines 1-5, 12-15, 25-28, 60-63, col. 4, lines 60-65, col. 5, lines 17-23, 45-49, 63-64). Yoon et al. shows depositing a CVD-Al layer on the barrier metal in the recess region, sputtering (physical vapor deposition (PVD)) the Aluminum layer, and reflowing the PVD-Al layer (col. 3, lines 53-56, col. 5, lines 49-51, col. 7, lines 45-50, col. 8, lines 25-28, col. 9, lines 63-67, col. 10, lines 1-5). Yoon et al. teaches the metal layer having a thickness of 25-100 Angstroms (col. 5, lines 49-50, col. 6, lines 3-10, 25-35).

Yoon et al. fails to show the metal or metal alloy inhibiting aluminum migration on the barrier. However, Yoon et al. recites, as well known in the art, the necessity to avoid aluminum diffusion (col. 1, lines 33-40). In addition, Hsu et al. discloses depositing a

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thin diffusion barrier (inhibiting aluminum migration) layer (510) on the barrier metal except in the recess region (Fig. 2B, col. 1, lines 45-50, col. 3, lines 24-32, col. 4, lines 35-45, col. 6, lines 45-50).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that the metal layer disclosed by Yoon et al. would correspond to the diffusion barrier taught by Hsu et al. The modification would provide a process for forming a metal interconnection that would prevent junction spiking and would improve electromigration characteristics (Yoon et al., col. 4, lines 30-32; Hsu et al., col. 2, lines 47-50).

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee (U.S. 5,534,463) and Givens et al. (U.S. 6,054,768) teach a method for forming a wiring layer. Lee et al. (U.S. 6,432,820) (same inventor) shows a method of selectively depositing a metal layer in an opening.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

*Maria Guerrero*  
Maria Guerrero  
Patent Examiner  
September 30, 2002